Dicamba:

2020 Registration Decision Overview

December 3, 2020

OPP Presenters:
BEAD: John Orlowski
EFED: Chuck Peck and Stephen Muela
RD: Lydia Crawford and Meg Hathaway

Presentation Goal and Outline

Goal:

Familiarize state representatives with EPA's 2020 assessment process for dicamba and the contents of the resulting registration decision, then provide time for questions

Outline:

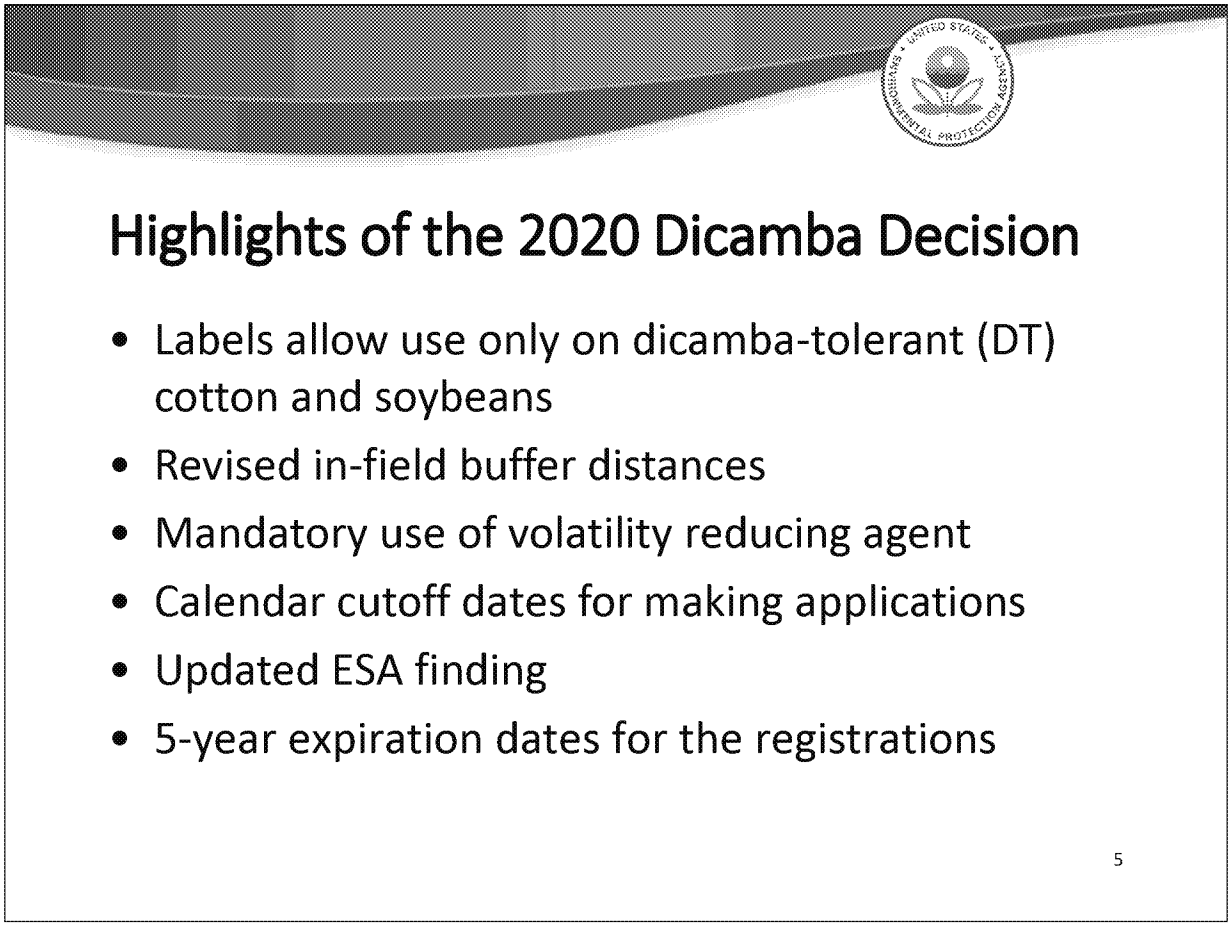
I. Background on the 2020 Dicamba Decision
II. Benefits and Impacts Assessment Work
III. Ecological Risk Assessment Work
IV. 2020 Dicamba Registration Decision
V. Time for Questions

Background on the 2020 Dicamba Decision

What was Registered?

- EPA's October 27, 2020 dicamba registration decision concerned three products containing dicamba and allowing for post-emergent, over-the-top (OTT) use
- Two new products (Engenia and XtendiMax) were registered
- The third product (Tavium) was granted an extension of its existing registration

EPA Registration #	Company Name	Product Name
7969-472	BASF	Engenia Herbicide
264-1210	Bayer	XtendiMax With VaporGrip Technology
100-1623	Syngenta	A21472 Plus VaporGrip Technology (Alternate Brand Name = Tavium)



An extremely short amount of time to do a huge amount of work.

New Information Considered

- 2020 AAPCO survey results
- Academic studies
- Registrant submissions:
  - Field studies
  - Lab studies
  - 6(a)(2) submissions
- Other information:
  - e.g. USDA-ERS soybean incident data

Benefits and Impacts Assessment Work

Cotton and Soybean: Benefits and Alternatives

- Allows in-season control of herbicide resistant broadleaf weeds (e.g., glyphosate, ALS herbicides)
  - Promote herbicide-resistance management
- Allows for increased preemergence use flexibility
  - Dicamba products for DT crops have no preplant restrictions, unlike older dicamba products
- Alternative herbicide programs:
  - Dicamba programs may be less expensive in both cotton and soybean

Note about alternatives:
- NCC supports dicamba but admit there are effective alternatives
- "One last comment I want to leave you with in terms of the Enlist E3 soybeans is about yield. In our multi-state research, we have found this trait to be pretty much on par with Roundup Ready 2 Xtend in terms of yield, and in most cases, it is priced well below Xtend." https://heftyseed.com/enlist-herbicide-options

Note about seed cost: bundles and rebates would apply to all herbicide seed technology systems – not just dicamba seed systems

Development of Dicamba Resistant Weeds

- Dicamba-resistant weeds, where present, reduce benefits
- Before OTT use on DT crops, two dicamba-resistant weeds
- After OTT use, confirmed dicamba-resistant Palmer amaranth
  - KS (2019) and TN (2020)
  - Decreased sensitivity in at least 5 states
- Decreased sensitivity of waterhemp in several states
- Dicamba resistance may also confer resistance to 2,4-D

applications-in-xtend-and-enlist-crops/

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How widespread is the resistance issue: high benefits in areas were resistance – some areas have multiple resistance and dicamba is important
(KS and TN)
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Tie back to the PRN to preserve the technology

EPA [6(a)(2)] Incidents vs External (USDA- ERS Soybean Survey) Incidents

Year	EPA Database	USDA-ERS Survey
2017	1,457	-
2018	3,010	64,497 fields
2019	3,302	-

- 2018 – significant underreporting compared to USDA Survey
- Incidents ~10% higher in 2019 after the 2018 decision based on registrant reports
- 2020 AAPCO survey a *"…degree of soybean cupping was as bad or worse than in any of the last four years, however, growers are* ***not reporting claims because of lack of response from registrants or the regulatory agencies****."* (Nebraska)

Incidents include injury reported to registrants vs visual symptoms

Incidents vs Symptoms – differences are not well defined

Reliable survey data (USDA-ERS)
USDA survey representing 90% of all U.S. soybean production
Confidential survey
Incidents are underreported to EPA
Selective investigation criteria (e.g., clients only), limited data
Not confidential
Regional market share of product

Ecological Risk Assessment Work

2020 Evaluation of New Registrations for Use on Dicamba-Tolerant Crops

- EPA conducted new ecological risk assessment and effects determinations for new registrant submissions, including consideration of:
  - Conditional data required from 2018 decision
  - New academic Off Field Movement (OFM) studies
  - Proposals for Drift Reducing Agents (DRA) and Volatility Reducing Agents (VRA)
  - Incident Data
  - Proposal for hooded sprayers w/reduced setback distances

Input from States that Informed the Assessment

- In January 2020, EPA met with academic researchers to discuss ongoing activities and research related to dicamba
- EFED received submissions from over 10 academic researchers
  - laboratory/greenhouse studies (3)
  - field studies examining off-field movement, tank mix cleaning, and plant effects (20+)
  - journal articles on humidome analysis, meteorological analysis, effects of hooded sprayers, and plants effects (9)
- Studies examined
  - potential for volatility and spray drift of three dicamba OTT products
  - impacts of buffering agents and volatility
  - plant effects

Incident Data

- EPA received reports of incidents from multiple sources including States, USDA, and registrants
- Some reports included detailed information on location and source of damage
- Enhanced reporting added additional quantitative element to EPA's analysis including;
  - Location of damage
  - Distance from application to damage
  - Date
- Using this information EPA compiled temperature data for each incident location and completed an analysis of incident occurrence in each state relative to temperature at the time of application

EPA's 2020 Ecological Risk Assessment

- Selected 10% Visual Signs of Injury (VSI) as protective of height and yield typically used for assessing risk for FIFRA & ESA
- Using field data, EFED developed distributions of distances to plant effects (DTE) to establish setbacks
- DTE analysis indicated need for
  - 240 ft in-field downwind spray drift* setback in all registered counties for FIFRA
- Evaluated Drift Reduction Agents (DRAs)
- Evaluated field and lab data for volatility reducing agents (VRAs)
- Incidents—analysis focused on number of days before cutoff date with high temperatures associated with volatility
- EPA evaluated combined impact of control measures for FIFRA and the conclusion was that the combined mitigations result in ≥90% certainty that effects will be limited to the treated field

*For soybeans only, the use of an optional hooded sprayer (for soybeans only) reduces the spray drift setback to 110 ft for FIFRA

Volatility Reducing Agents (VRA) Data

- Added to tank mix to help reduce volatility of dicamba
- Laboratory data (n=137) showed greater than or equal to 80% reduction in volatility for different tank mixes at temperatures at or above 95F
- Field studies (n=7) showed decreases in flux rates, but were limited when looking at distances to effects to plants
- VRAs are one control measure that EPA included to control volatility and shouldn't be looked at alone. Mandatory cut-off dates reduce the potential for applications when temperature can result in volatility. In addition, in counties with ESA restrictions an in-field omnidirectional buffer is an additional volatility control measure.

2020 Ecological Risk Assessment Conclusions for ESA

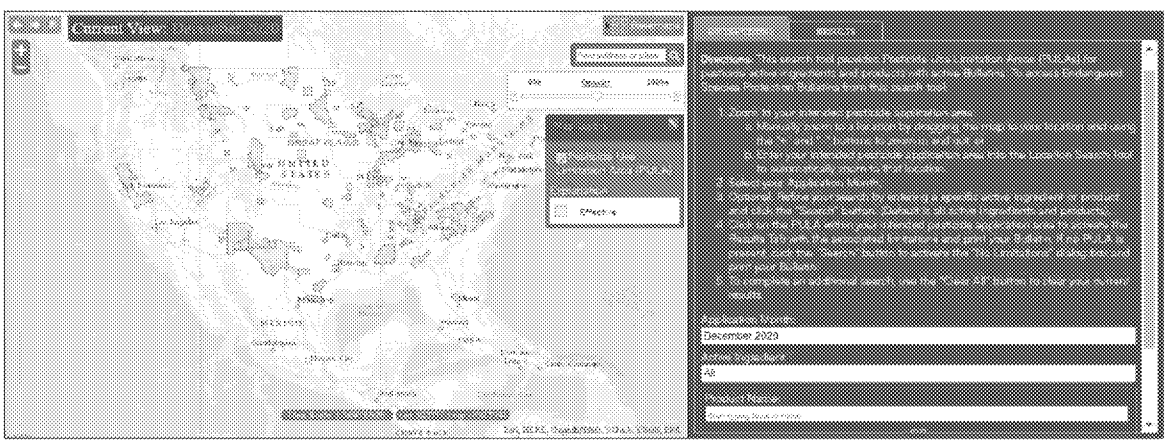
- EFED developed a Cumulative Probability function to consider impact of in-field buffers, mandatory VRAs and application date cut-offs on non-target risks
- Resulting conclusion was that these combined control measures result in ≥98% certainty that effects greater than 10% VSI will be limited to the treated field
  - 310 ft in-field downwind spray drift* setback in select counties for ESA
  - 57-foot omni-directional in-field setback in select counties for ESA
- Protective of direct effects and indirect effects to listed species with obligate relationships to sensitive species

*The use of an optional hooded sprayer (for soybeans only) reduces the spray drift setback to 240-foot for ESA

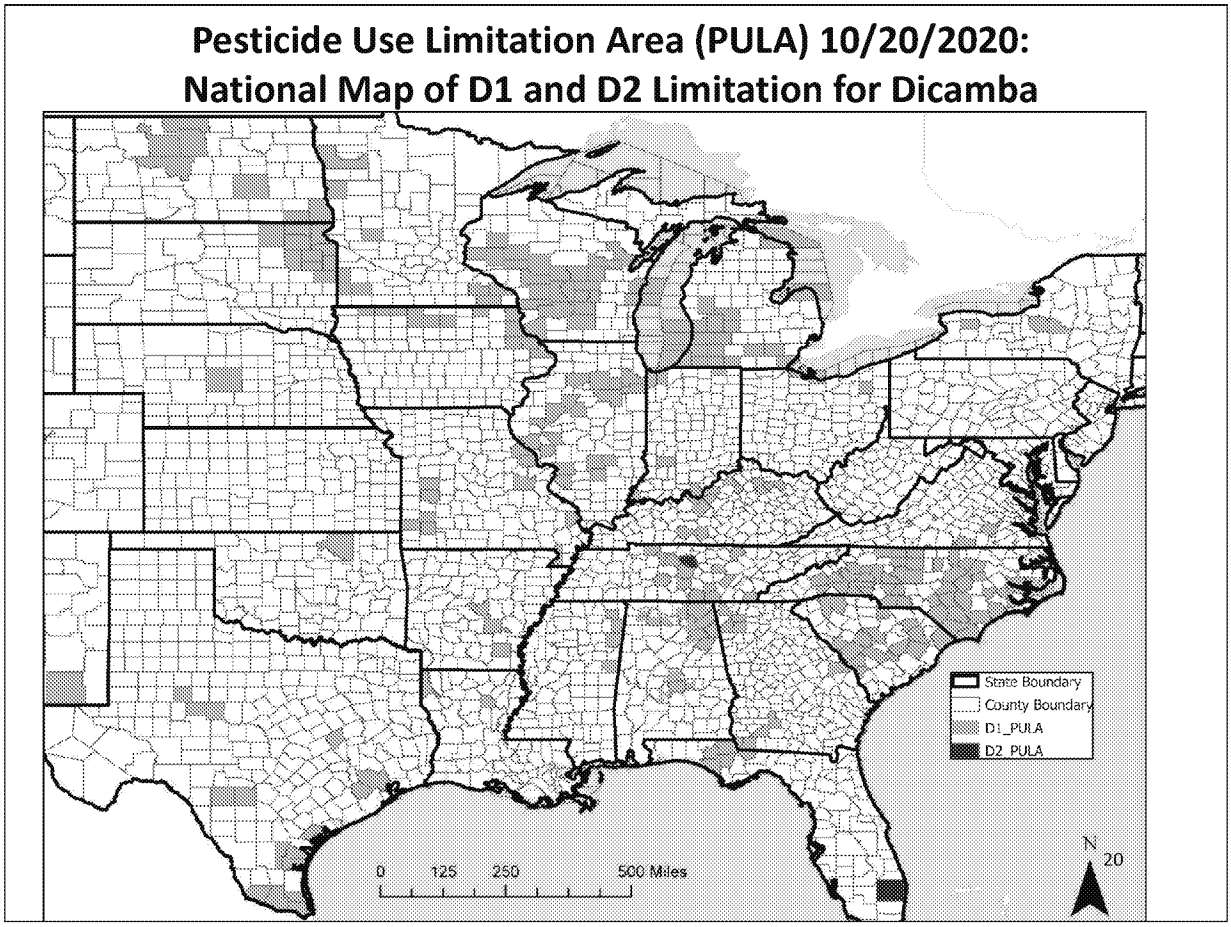
Implementing ESA via Bulletins Live! Two (BLT)

- ESA control measures are applicable to 289 counties that grow soybean and cotton in the 34 registered States
- Implemented through BLT
  - https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins
  - EPA's web-based platform for growers to identify ESA control measures applicable to them, if any

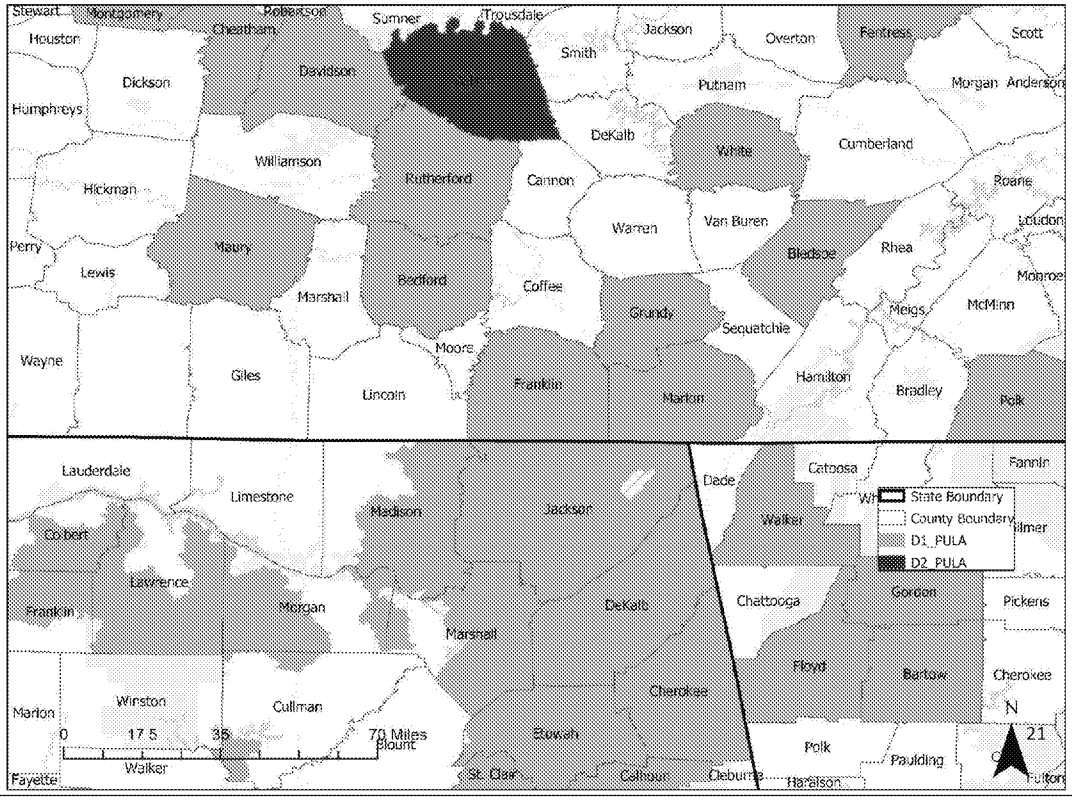
BLT Homepage



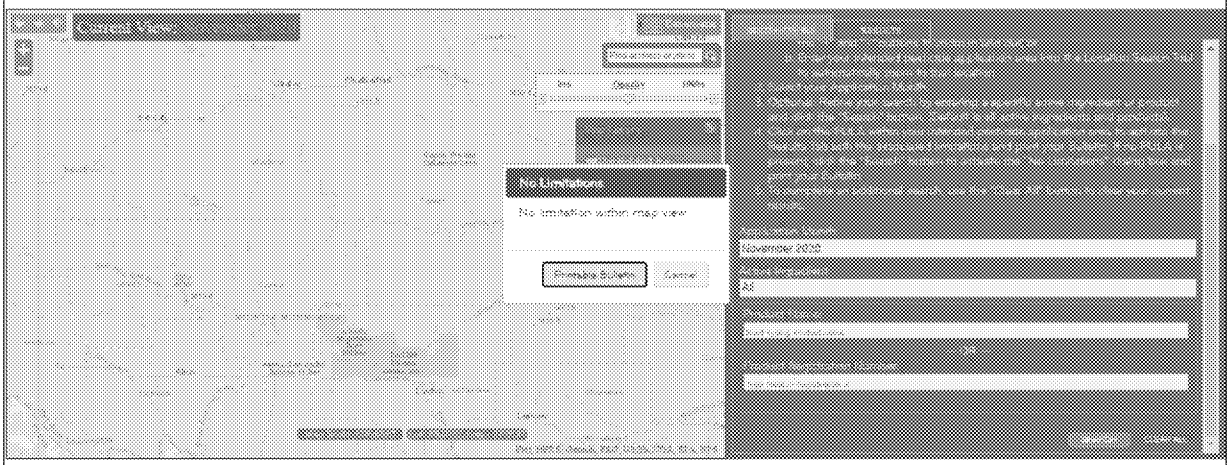
Pesticide Use Limitation Area (PULA) 10/20/2020: National Map of D1 and D2 Limitation for Dicamba



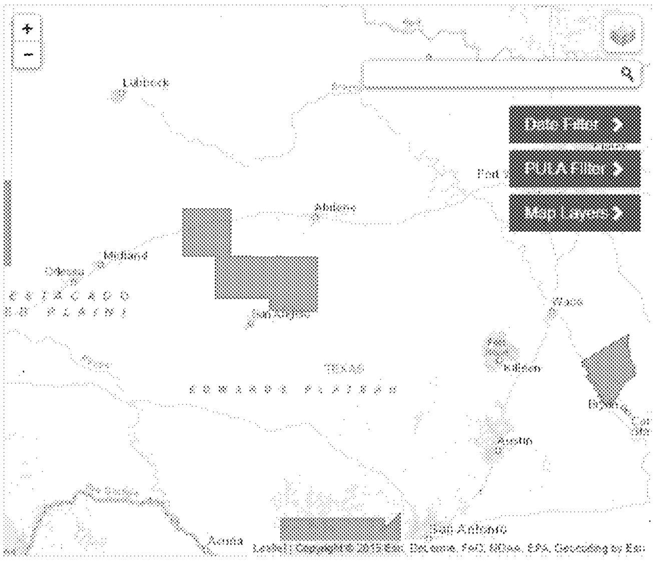
PULA 10/20/2020: Example of County Level Map of D1 and D2 Limitation for Dicamba



Example of BLT with no PULA



Example of BLT Limitations



Effective Date: November 2020

Pesticide Use Limitation Summary Table

AI/Product	Use	App Method	Formulation	Code
XTENDIMAX WITH VAPORGRIP TECHNOLOGY [264-1210]	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
XTENDIMAX WITH VAPORGRIP TECHNOLOGY [264-1210]	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
A21472 PLUS VAPORGRIP TECHNOLOGY [100-1623]	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
A21472 PLUS VAPORGRIP TECHNOLOGY [100-1623]	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
TAVIUM PLUS VAPORGRIP TECHNOLOGY [100-1623]	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
TAVIUM PLUS VAPORGRIP TECHNOLOGY [100-1623]	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
Diglycolamine salt of dicamba (3,6-dichloro-o-anisic acid)	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
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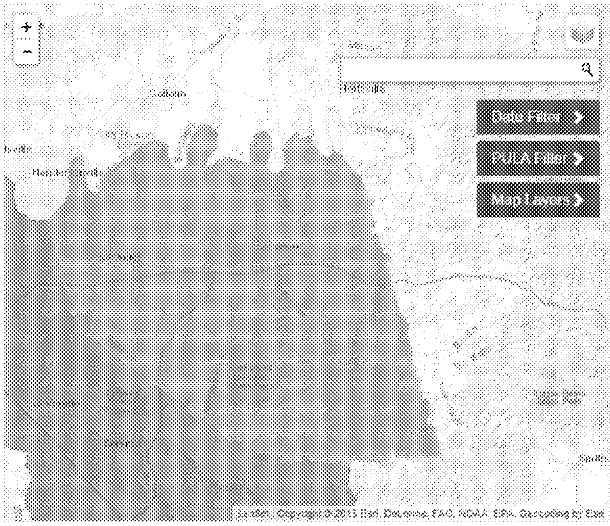
BAPMA salt of Dicamba	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120
BAPMA salt of Dicamba	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
ENGENIA HERBICIDE [7969-472]	Dicamba-Tolerant Cotton	Ground spray	Liquid	D120
ENGENIA HERBICIDE [7969-472]	Dicamba-Tolerant Soybean	Ground spray	Liquid	D120

Codes and Limitations Table

D120	To protect federally listed threatened and endangered species, both a 310-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required. If applying to dicamba-tolerant soybeans with a qualified hooded sprayer, both a 240-foot in-field wind-directional spray drift buffer and a 57-foot omnidirectional in-field buffer are required to protect federally listed threatened and endangered species. Please see the label for a link to the website(s) with your product's qualified hooded sprayers. The following areas may be included in the buffer distance composition when directly adjacent to the treated field edges: 1. Roads, paved or gravel surfaces, mowed grassy areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated field. 2. Planted agricultural fields containing dicamba-resistant plantings of cotton and soybeans. 3. Areas covered by the footprint of a building, silo, or other man made structure with walls and or roof.

Example of BLT Limitations



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Codes and Limitations Table

D220	Do not apply in the following counties: Wilson County, TN or Palm Beach County, FL

2020 Dicamba Registration Decision

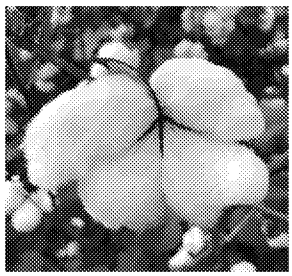
Milestone	Date
EPA releases 2020 registration decision	10/27/2020
Expiration date for the 2020 dicamba registrations	12/20/2025

Guiding Principles for Reaching a Decision

- Statutory Requirements
  - ESA No-effects determination
  - FIFRA risk-benefit decision
- Following the Science
- Balancing the Impacts of Control Measures
  - All control measures to reduce incidents are likely to impact user's ability to use the product
  - Conversely, measures to provide farmers with flexibility are more likely to negatively impact non-users

2020 Dicamba Registrations: Approved Uses

- For use ONLY on DT cotton and DT soybeans
  - OTT use
  - Includes pre-emergent and post-emergent applications to DT-crops
- Not for use on any non-DT crops
  - New to the 2020 labels
- List of states allowing use is unchanged from 2018



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Not allowing any uses on non-DT crops is intended to increase the clarify of the labels.

2020 Dicamba Registrations: Application Timing

- The 2020 federal labels introduce mandatory calendar cutoff dates for applications:
  - Dicamba-tolerant **soybeans**: DO NOT apply later than **June 30**
  - Dicamba-tolerant **cotton**: DO NOT apply later than **July 30**
- Calendar dates are more enforceable than growth stages
- Inversion, rainfall, wind speed, & sunrise/sunset timing restrictions are unchanged from 2018 labels

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Note: Xtendimax has a formulation-specific R1 growth restriction and Engenia does not.
"Days after planting" cutoffs for dicamba that appeared on the 2018 labels have been removed. Because Tavium contains both dicamba and S-metolachlor, growth stage requirements driven by the S-metolachlor remain on that label.

Volatility Reducing Agent (VRA) Requirement

- All applications of Engenia, Tavium, and XtendiMax must include a VRA in the tank mix
- The purpose of the VRA is to reduce volatility
- Applicators can use any VRA that has been tested and is listed as approved on the registrant companies' websites
- So far registrants have developed and tested two VRAs
  - BASF: SENTRIS; Bayer: VaporGrip Xtra
- Each registrant company is required to maintain a website of acceptable VRAs
- Registrants are also required to ensure that sufficient quantities of VRAs are available in channels of trade

*Note: In this registration decision, "volatility reducing agent," or "VRA" = "pH Buffering Agent."

As a talking point, we should mention that the buffering agents initially approved were based on data that EPA reviewed that supported the reduction in volatility.

Required Buffer Distances

- In counties without endangered and threatened species concerns:
  - A downwind, in-field buffer distance of **240 ft** is required for all applications
- In counties with endangered and threatened species concerns:
  - Listed Species Protection Requirement of a **310 ft** downwind in-field buffer and an omnidirectional in-field buffer of **57 ft** for all applications.
- How do I know which type of county I am in?
  - You must check Bulletins Live! Two (BLT) prior to making an application.
  - Labels provide instructions on how to access Bulletins Live! Two.

With Optional Hooded Sprayers

- Hooded sprayer systems have the potential to reduce spray drift during pesticide applications
- If using a qualified hooded sprayer, the buffer distances for applications to soybeans may be reduced
  - For counties without listed species concerns, buffer distances are reduced from **240 to 110 ft**
  - For counties with listed species concerns, buffer distances are reduced from **310 to 240 ft**
- No exemption from omnidirectional in-field buffer of **57 ft** for ESA counties
- Only hooded sprayers that have met EPA's performance standard and are specified on the appropriate registrant's website are eligible for reduced buffer distances
- EPA notes there is currently limited availability of hooded sprayers but wishes to encourage the use of drift reduction technology of various forms

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There is uncertainty translating soybean data to cotton. Therefore EPA is unable to move forward with a buffer distance reduction for cotton until we have additional information.

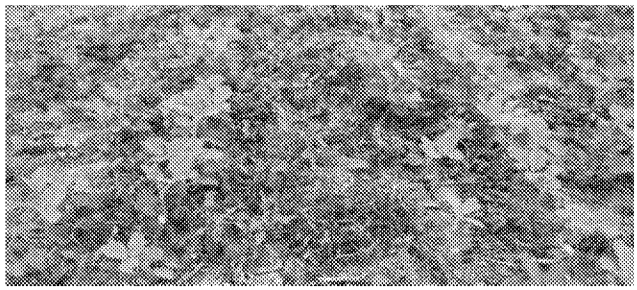
Other Types of Requirements

- Training
  - In addition to certified applicator training, applicators of these products must complete annual, dicamba-specific training
- Recordkeeping
  - Requirements are listed on the labels
  - VRA use is one new component of the 2020 list of recordkeeping requirements
- Herbicide resistance management
  - Especially important because confirmed detections of dicamba-resistant Palmer amaranth since 2019

Required dicamba training topics are listed in the registration notices. Examples topics include new mitigation measures such as the VRA requirement, equipment clean-out procedures, reporting incidents and crop failures, and how to use Bulletins Live 2!

Options to Help Preserve the Technology

- Locally developed resistance management plans
  - Work with University Extension and crop consultants
- Encourage scouting before and after treatment
- Report suspected resistance to registrants, crop consultants, and University Extension agents



https://news.utcrops.com/2017/05/reports-poor-palmer-amaranth-control-dicamba/

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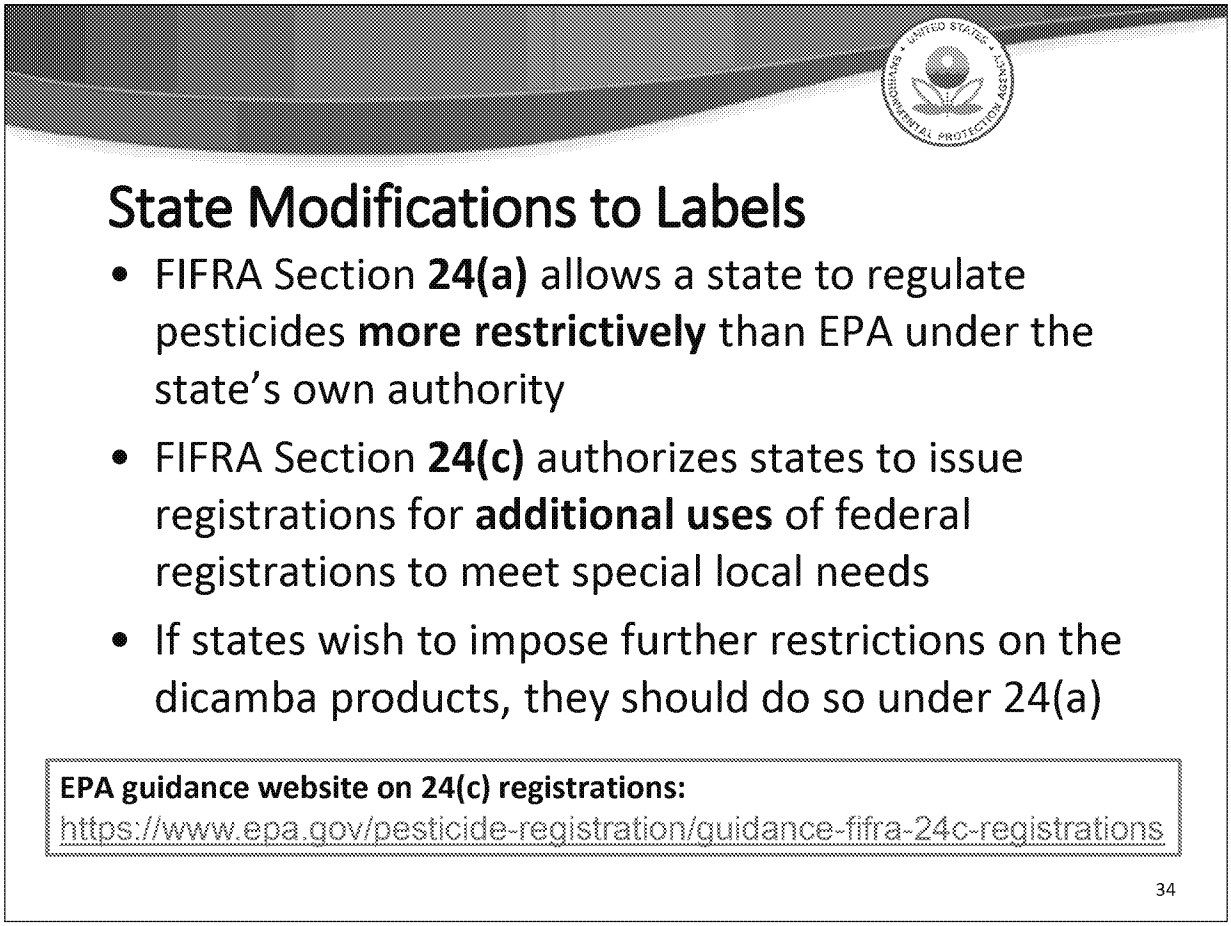

EPA understands that this is a big change and may be challenging for some states. We want to work together to support state needs.

Qs and As for Applicators

- Am I required to use a hooded sprayer?
  - NO. Hooded sprayers can be used as an option. However, only hooded sprayers that have met protocol requirements qualify for reduced buffer distance requirements.
- Am I required to tank mix with a drift reduction agent (DRA) as well as a pH buffering agent/volatility reduction adjuvant?
  - This varies by product. Check your product label and accompanying tank mix website for the appropriate tank mixing requirements.
- Can I now use existing stocks of dicamba products that were vacated by the June 3, 2020 Court decision?
  - NO. The registrations impacted by that decision [Xtendimax with Vaporgrip Technology (EPA Reg. No. 524-617); Engenia (EPA Reg. No. 7969-345); and FeXapan (EPA Reg. No. 352-913)] remain cancelled. Any application of those products is illegal.

Other Questions?